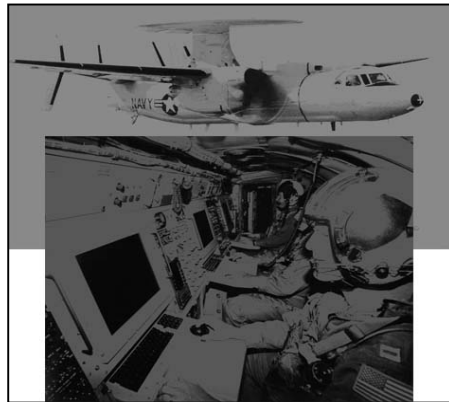


## **E-2 AIRBORNE EARLY WARNING (AEW) HAWKEYE 2000**



Hawkeye 2000 is an umbrella term for multiple improvements to the Group II E-2C. The improvements include: the replacement of the current mission computer with commercial-off-the-shelf computer (Mission Computer Upgrade [MCU]) and replacement of the control and display consoles with commercial-off-the-shelf workstations (Advanced Control Indicator System [ACIS]), the integration of the airborne variant of the Cooperative Engagement Capability (CEC) system, the addition of an upgraded inertial navigation system, an upgraded cooling system, UHF Satellite Communications (SATCOM), replacing the current Passive Detection System with an Electronic Support Measures (ESM) system, and development of a Mission Information Transfer System (MIST).

### **BACKGROUND INFORMATION**

The key objective of this series of modifications is the integration of Cooperative Engagement Capability (CEC). To carry the CEC, the E-2C required increased mission computing and display capabilities, as well as an offset in weight and volume. The modifications will be incorporated into new E-2C aircraft production. The Navy plans to retrofit these improvements into older E-2C aircraft.

In FY02, the Navy will start the Radar Modernization Program (RMP) for the E-2C. This program will replace the E-2C's radar with an UHF-Active Electronically Scanned Array (AESA) radar. This radar is intended to provide significantly increased performance over the current radar, particularly overland.

### **TEST & EVALUATION ACTIVITY**

MCU Technical Evaluation (TECHEVAL) was conducted from July to October 2000. During TECHEVAL, there were 18 test flights totaling 84.8 flight hours and approximately 350 hours of ground testing.

MCU OPEVAL was conducted from November 2000 to April 2001. An operational E-2C squadron, VAW-117, was designated the OPEVAL squadron, and received four LRIP MCU E-2Cs. The squadron employed the aircraft in normal operational training, exercise, and aircraft carrier deployment work-up flights. Prior to the start of the MCU Operational Evaluation (OPEVAL), there were one Part I and 17 Part II Deficiencies. Joint Interoperability certification was required prior to commencement of the MCU OPEVAL but was waived. COTF evaluated the MCU to be Operationally Effective/Not Operationally Suitable. During the OPEVAL, the ACIS was assessed potentially operationally Suitable.

## **TEST & EVALUATION ASSESSMENT**

There was no Beyond Low Rate Initial Production Report prepared for the MCU OPEVAL. Of the five Effectiveness COIs, COTF evaluated four as satisfactory: Tracking, Survivability, Tactics, and System Management. COTF found the Joint Interoperability COI to be partially resolved. Of the eleven Suitability COIs, COTF evaluated six as satisfactory: Reliability, Maintainability, Availability, Compatibility, Human Factors, and Safety. COTF evaluated Logistic Supportability, Training, Documentation, and Built-In-Test (BIT) Performance as unsatisfactory. COTF also found Interoperability to be partially resolved.

DOT&E did not concur with all of COTF evaluation. DOT&E found the COIs of Joint Interoperability unresolved instead of partially resolved as there was no test event in which the MCU-equipped E-2C demonstrated that it could effectively interface and operate with corresponding systems or units of other U.S. forces in the execution of its intended operational mission.

The E-2C entered OPEVAL without Navy or Joint Interoperability Test Command (JITC) Link 11 and Link 16 interoperability testing or certification. During the OPEVAL, there was not sufficient joint interoperability testing to adequately evaluate Link 11 or Link 16 interoperability. Also during the OPEVAL, the Navy Center for Tactical Systems Interoperability (NCTSI) completed an evaluation that identified one critical and numerous non-critical interoperability issues. After the conclusion of the OPEVAL, NCTSI tested software fixes to address the interoperability issues. Based on this testing of the software fixes, the Chief of Naval Operations authorized Interim Authority to Operate for the E-2C MCU Link 11 and Link 16 implementation for the first deployment only.

DOT&E differed in its assessment of the Tracking COI. This COI is assessed as unsatisfactory because during TECHEVAL the MCU E-2C, relative to the Group II E-2C, demonstrated a decreased capacity for real tracks. During OPEVAL there was no testing designed to test Track Loading. Although required in the MCU test plan, COTF did not report a calculation of Track Loading. Additionally, Suitability is a concern in that aircraft carrier power carts do not deliver constant and “clean” power for MCU E-2C start-up.

Logistic Supportability is a concern. Each MCU E-2C sortie requires a minimum of four Removable Media Cartridges (RMCs). The RMCs demonstrated a high failure rate during OPEVAL with 11 of the squadron’s 24 RMC failing. The majority of these failures (8 of 11) occurred during the 3 weeks of carrier operations, the primary operational environment. It is not possible for the squadron to repair a failed RMC and no data was recorded concerning the time it takes for the squadron to receive replacement RMC’s.

DOT&E disagrees with COTF’s assessment of the ACIS. While the ACIS met its maintainability requirement for Mean Time to Repair, it did not meet the Reliability requirement for Mean Time Between Failures (MTBF) of  $\geq 136.3$  flight hours and therefore is a suitability risk.

## **LESSONS LEARNED**

The MCU ORD discusses that the MCU hardware should comprise Commercial-Off-the-Shelf (COTS) components. Currently the MCU primarily uses Militarized COTS (MCOTS). There are indications that the MCU will be replaced when the RMP is implemented, implying that the MCU will not grow as the E-2C and COTS components grow. Instead, the MCU will rely upon outdated, hard to replace MCOTS hardware until the arrival of RMP.

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